

HAUSTORIUS JAYNEAE, A NEW SPECIES OF HAUSTORIID AMPHIPOD FROM THE NORTHERN GULF OF MEXICO, WITH NOTES ON ITS ECOLOGY AT PANAMA CITY BEACH, FLORIDA U.S.A.

JOHN M. FOSTER¹ AND SARA E. LECROY²

¹504 East Pine Forest Drive, Lynn Haven, Florida 32444

²Invertebrate Zoology Section, Gulf Coast Research Laboratory, P.O. Box 7000, Ocean Springs, Mississippi 39564

ABSTRACT A new species of sand-burrowing amphipod, *Haustorius jayneae*, is described from the swash zone and shallow subtidal sands along the north Florida and Mississippi Gulf coasts. It is most similar to *H. canadensis* from the American Atlantic coast, differing primarily in the presence of a distinct anterodistal spinous lobe on pereopod 6, article 5; a longer row of distal marginal spines on pereopod 7, article 4; and fewer proximal spines on the peduncle of uropod 1. A revised key to the known species of *Haustorius* is included and information on the ecology of *H. jayneae* n. sp. at Panama City Beach, Florida, is reviewed.

INTRODUCTION

Taxonomic and zoogeographic studies of Gulf of Mexico Haustoriidae are scarce. A lack of keys for Gulf material, a reflection of the underdeveloped state of knowledge about the family in the region, has limited workers to the use of keys and guides written primarily for Atlantic coast material. As a result, government and private environmental assessment reports often provide species lists in which citations are limited to genera, or where species are listed which do not occur in the Gulf of Mexico.

Existing knowledge of the Gulf Haustoriidae is reported primarily in papers which describe new species (Pearse, 1908; Robertson and Shelton, 1978; Robertson and Shelton, 1980; Thomas and Barnard, 1984; Foster, 1989) and in several ecological papers which have reported undescribed species and recognized them as such (Thomas, 1976; Shelton and Robertson, 1981). Foster (1989) reviewed the history of haustoriid studies in the Gulf and listed the known species.

Among the numerous taxonomic problems associated with the Haustoriidae, questions concerning the type genus *Haustorius* Muller, 1775 are particularly significant. Three species are currently recognized in the genus. The type species, *Haustorius arenarius* (Slabber, 1769), is distributed in the northeastern Atlantic and has also been reported from the Gulf of Mexico (Pearse, 1912), although Croker (1967) considered such early records to be the result of erroneous identifications. The remaining two species, *Haustorius canadensis* Bousfield, 1962 and *Haustorius algeriensis* Mulot, 1967, are distributed in the northwestern Atlantic and along the North African coast in the Mediterranean Sea, respectively.

Five additional haustoriid species originally assigned to the genus *Haustorius* have since been placed in other genera. These include the Gulf of Mexico species *Pseudohaustorius americanus* (Pearse, 1908) and the North Atlantic species *Acanthohaustorius spinosus* (Bousfield, 1962), both removed from *Haustorius* by Bousfield (1965). In addition, the northern Pacific species *Eohaustorius washingtonianus* (Thorsteinson, 1941), *E. eous* (Gurjanova, 1951), and *E. cheliferosus* (Bulycheva, 1952) were removed from *Haustorius* by Barnard (1957).

A number of undescribed haustoriid species are known to occur in the Gulf of Mexico. Bousfield (1970) indicated that at least ten undescribed species of Haustoriidae occur in the region, although the number of species in the type genus was not reported. In addition, recent studies have resulted in the reporting of a "long-rostrate" *Haustorius* species from North Carolina (Bousfield, 1965; Fox and Bynum, 1975). Although no formal description was published, this form is included in the key provided in this paper.

Ecological reports with reference to *Haustorius* in the northern Gulf of Mexico are numerous. For example, in the area between Cape San Blas, in the Florida Panhandle, and Mississippi Sound, the genus has been reported by Saloman (1976), Saloman and Naughton (1977;1978), Saloman et al. (1982), Taylor (1987), and Heard and Stuck (1988). Thomas (1976) also reported an undescribed species of *Haustorius* from Barataria Bay, Louisiana, occurring in fine sand from the drift line to a depth of 1 -2 meters, and Robertson and Shelton (1980) found an undescribed species in a similar habitat on the Texas coast.

METHODS

Material for this study came from several locations along the coasts of Florida and Mississippi. These include St. Andrew Bay, Panama City Beach, Cape San Blas, and Perdido Key, Florida, as well as Horn and Ship Islands, Mississippi. In all localities, amphipods were collected in the swash zone and from tidal pools with suction devices (yabby pumps), push nets, or coring tools. See Saloman (1976) and Heard and Stuck (1988) for detailed information on localities, methodology, sedimentology, and associated fauna.

Margins of the antennae and uropods are referred to as dorsal and ventral in the text, as opposed to anterior and posterior, because of their orientation along the main axis of the body.

Haustoriidae Stebbing, 1906
Haustoriinae Bousfield, 1965
Haustorius Muller, 1775
Haustorius jayneae, new species
Figures 1 - 4

Haustorius new species: Saloman and Naughton, 1977, pp. 359-362

Haustorius species: Saloman and Naughton, 1978, pp. 67-68

Material Examined

Holotype: Female, 6.0 mm, SAB-e, St. Andrew Bay, Florida, West Pass, medium sand in wave pool above swash, 25 °C, 28 ppt, 14 Oct. 1989, USNM 250725, coll. J. M. Foster.

Paratypes: Female, 8.0 mm, SAB-a, GCRL 1141; female, 5.3 mm, SAB-b, USNM 250726; male 5.0 mm, SAB-c, USNM 250727; male, 4.0 mm, SAB-d, USNM 250728; male, 6.0 mm, SAB-f, USNM 250729; male, 7.0 mm, SAB-g, GCRL 1141; male, 5.0 mm, SAB-h, USNM 250730; female, 7.0 mm, SAB-i, USNM 250731; female, 7.0 mm, SAB-j, USNM 250732; male, 6.0 mm, SAB-k, USNM 250733, Panama City Beach, Florida, moderately sorted fine sand, swash zone, 18.0 °C, 32.70 ppt, 4 Feb. 1975, coll. C. H. Saloman. Male, 5.5 mm, CSB-a, USNM 250734; male, 6.0 mm, CSB-b, USNM 250735; female (ovg), 5.0 mm, CSB-d, USNM 250736; female, 5.0 mm, CSB-f, USNM 250737; female, 7.0 mm, CSB-g, USNM 250738, Cape San Blas, Florida, wet, intertidal fine sand with shell hash, 27.5 °C, 29 ppt, 27 Sept. 1987, coll. J. M. Foster. Male, 7.5 mm, CSB-c, USNM 250739; Cape San Blas, Florida, longshore tidal pool on moderate energy beach in fine sand, 16.8 °C, 30 ppt, 11 Mar. 1989, coll. J. M. Foster. Male, 6.0 mm, PK-d, USNM 250740; female 6.0 mm, PK-e, USNM 250741; female, 7.0 mm,

PK-f, USNM 250742, Perdido Key, Florida, swash zone in medium sand, 23 July 1987, coll. R.W. Heard. Male, 10.0 mm, MISS-a, USNM 250743; female, 10.0 mm, MISS-b, USNM 250744; female, 8.0 mm, MISS-c USNM 250745, Ranger Lagoon, Horn Island, Mississippi Sound, swash zone, 25 Jan. 1989, coll. R. W. Heard.

Additional Material: 5 males, 9 females, 4 juveniles, USNM 250746; 4 males, 8 females, 1 juvenile, GCRL 1142, St Andrew Bay, Florida, West Pass, medium sand in wave pool above swash zone, 14 Oct. 1989, coll. J. M. Foster. 4 males, 5 females, 7 juveniles, USNM 250747; 31 males, 42 females (1 ovg.), 73 juveniles, USNM 250748; 7 males, 7 females (1 ovg.), 9 juveniles, GCRL 1143, Perdido Key, Florida, subtidal sand, 4-6 Oct. 1989, coll. R. W. Heard. 2 males, 1 female (ovg.), 2 juveniles, USNM 250749; 1 male, 1 female, GCRL 1144, Horn Island, Mississippi Sound, swash zone sand, 25 Jan. 1990, coll. R. W. Heard. 7 males, 4 females (3 ovg.), USNM 250750; 8 males, 3 females (2 ovg.), GCRL 1145, Ship Island, Mississippi Sound, subtidal sand, 12 July 1988, coll. R. W. Heard. 2 males, 2 females, USNM 250751; 1 male, 1 female, GCRL 1146, Ship Island, Mississippi Sound, swash zone sand, 12 July 1988, coll. R.W. Heard.

Diagnosis

Antenna 1, accessory flagellum 4-5 segmented. Rostrum short, subacute, wide at base, not exceeding midpoint of antenna 1, peduncle 1. Pereopod 5, article 6, anterior margin with 3-4 spine groups. Pereopod 6, article 4, posterior margin markedly oblique proximally, bearing 3-4 spines distally; article 5 subquadrate with distinct anterodistal spinous lobe. Pereopod 7, coxal plate with setae on posterodistal margin only; article 4, proximal margin sharply set off from posterior margin, posterior margin with 1 spine group, distolateral marginal spines extending half length of distal margin. Uropod 1, peduncle, dorsolateral margin with 1-2 proximal spines, proximal and distal spines only. Telson cleft one-third distance to base.

Description

Paratype male SAB-f, 6.0 mm, Panama City Beach, Florida

Head - Broadest medially, rostrum blunt, wide at base; slightly exceeding anterolateral apices, extending one-quarter of dorsally visible length of antenna 1, peduncle 1; antennal sinuses markedly convave.

Antenna 1 - Peduncle article 1 and 2 subequal, article 3 two-thirds length of article 2; peduncle 1, dorsolateral margin lined with plumose setae, ventrolateral margin with 4 pilose spines; peduncle 2 widened distally, dorsal margin with a row of plumose setae interspersed with shorter simple setae, lateral surface with mixed plumose

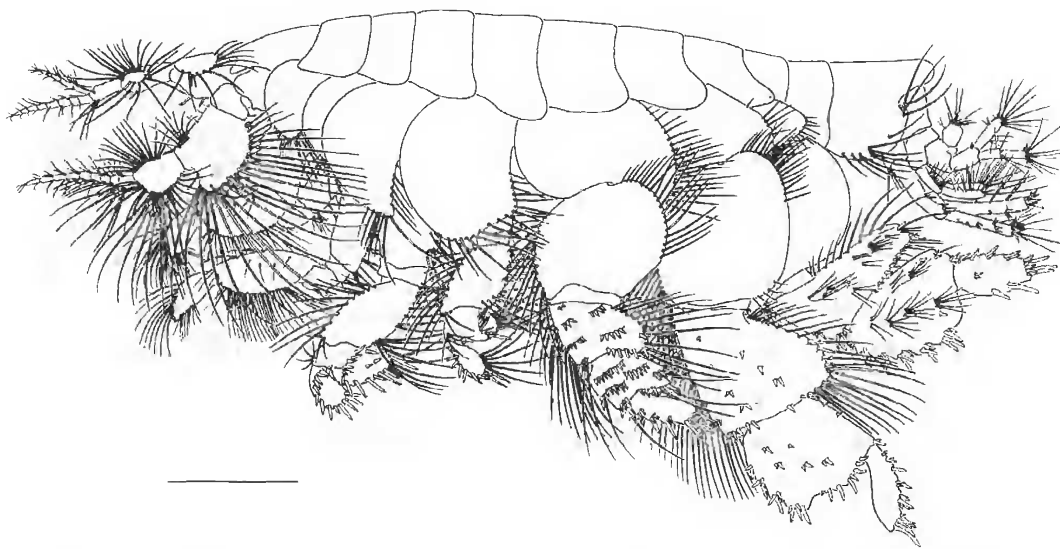


Figure 1. *Haustorius jayneae* n. sp.. Lateral view of adult female (6.0 mm) from St. Andrews Bay, Florida. Scale = 1.0 mm.

and simple setae; peduncle 3, ventral margin with row of long pilose spines inserted near articulation with flagellum; flagellum with 9 articles, each with short simple setae inserted terminally, several with aesthethsacs; accessory flagellum 4 segmented.

Antenna 2 - Peduncle 4 expanded ventrally to form deep lobe with broadly rounded distal projection, ventral margin with 22 spines inserted laterally and a row of densely plumose setae inserted medially along margin, 5 plumose spines on proximal half of ventral margin, lateral surface with row of 5 setae near proximal dorsal margin, medial surface with oblique row of 6 setae across width of article, dorsal margin with distolateral row of plumose setae, ventral margin with 2-3 thin pilose spines distally in sinus formed by distal lobe of article; article 5 slightly over half length of article 4, with strongly convex ventral lobe, ventral margin lined with long plumose setae, distoventral corner with cluster of plumes, several thin spine-like setae and 1 thick pilose spine, distolateral margin with row of thinner, shorter plumose setae and scattered slender, simple setae; distal half of dorsal margin with row of plumose setae; flagellum of 10 articles, article 1 longest, with distoventral row of plumose setae, article 2 half length of article 1 and bearing 1 distoventral plumose seta, article 3 with 1 distoventral plumose seta, remaining articles with groups of simple terminal setae.

Upper Lip - Broad, apex flattened, corners abruptly rounded.

Lower Lip - Inner lobes extending two-thirds length of outer lobes, truncate distally and finely pilose; outer lobes broadly rounded, pilose around margins, both lobes with numerous short spines along inner distal margin.

Mandible - Right side, incisor bifid, raker row of 10 distally serrate blades; molar triturative with 1 projecting plumose seta; palp article 2 with marginal and facial row of short simple setae, article 3 with 17 pectinate spines in comb row, 14 - 15 distally tapered, minutely pectinate terminal spines. Left side, lacinia mobilis short, conical.

Maxilla 1 - Inner plate with 10 sparsely plumose marginal setae; outer plate with 4 stout, smooth, blunt and 12 slender, minutely serrate, subacute distal spines; palp article 2 with marginal and apical plumose setae, and tapered terminal spines with recurved tips; bailer lobe large and densely setose.

Maxilla 2 - Inner plate linguiform, slender, with plumose marginal setae and oblique row of plumose facial setae; outer plate large, lunate, outer margin lined with fine setae, 14 stout, distally tapered comb spines medially, inner margin with 30 - 32 sparsely plumose setae distally, lined with minutely plumose setae proximally.

Maxilliped - Inner plate with 11 inner marginal setae, proximal setae short and finely pectinate on both edges, distal setae longer, plumose, apical margin with 2 blunt, stout spines, aboral surface with 2 penicillate setae and a row of distal spines, oral surface with transverse row

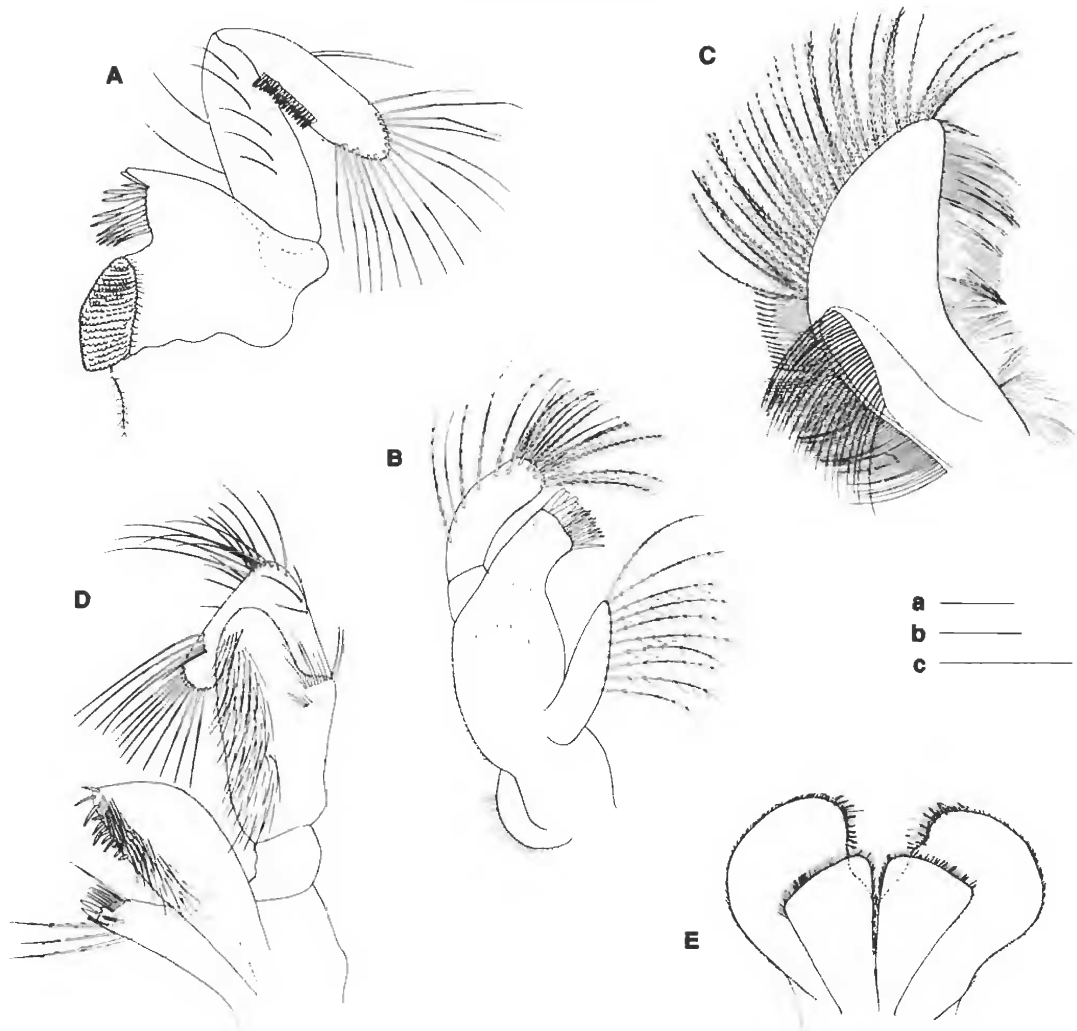


Figure 2. *Haustorius jayneae* n. sp., paratype male SAB-f (6.0 mm): (A) mandible; (B) maxilla 1; (C) maxilla 2; (E) lower lip. Adult male (6.0 mm), St. Andrew Bay, Florida; (D) maxilliped. Scales: a = 0.2 mm (B-C, E); b = 0.2 mm (A); c = 0.4 mm (D).

of distal spines; outer plate slightly broader than inner with 12 recurved spines and numerous transverse rows of setae; palp article 3 with expanded distally, dense transverse rows of setae on inner margin, article 3 geniculate with long serrate setae and simple setae on distal margin, 9 elongate spines terminally, aboral surface with central row of simple setae.

Coxal Plates - Plates 1-4 increasing in size with each successive plate, combined ventral margins forming a gentle curve.

Gnathopod 1 - Coxa deeper than wide, gently concave posteriorly with 6 plumose posterior marginal setae, posteroventral angle with 3 long, plumose setae, antero-

distal margin with a row of simple setae, increasing in length distally; article 2 narrowed proximally with long, widely spaced simple setae on posterior margin; article 5, posterior margin with dense clusters of long simple setae along lateral and medial surfaces; article 6 one-half length of article 5, anterodistal margin with 6 - 7 transverse rows of long, distally recurved, finely pectinate setae, posterodistal margin with 5 row of shorter, distally recurved, finely pectinate setae, posterodistal margin with 5 rows of distally recurved, finely pectinate setae; article 7 one-quarter length of article 6, projecting nail subequal in length to article 7.

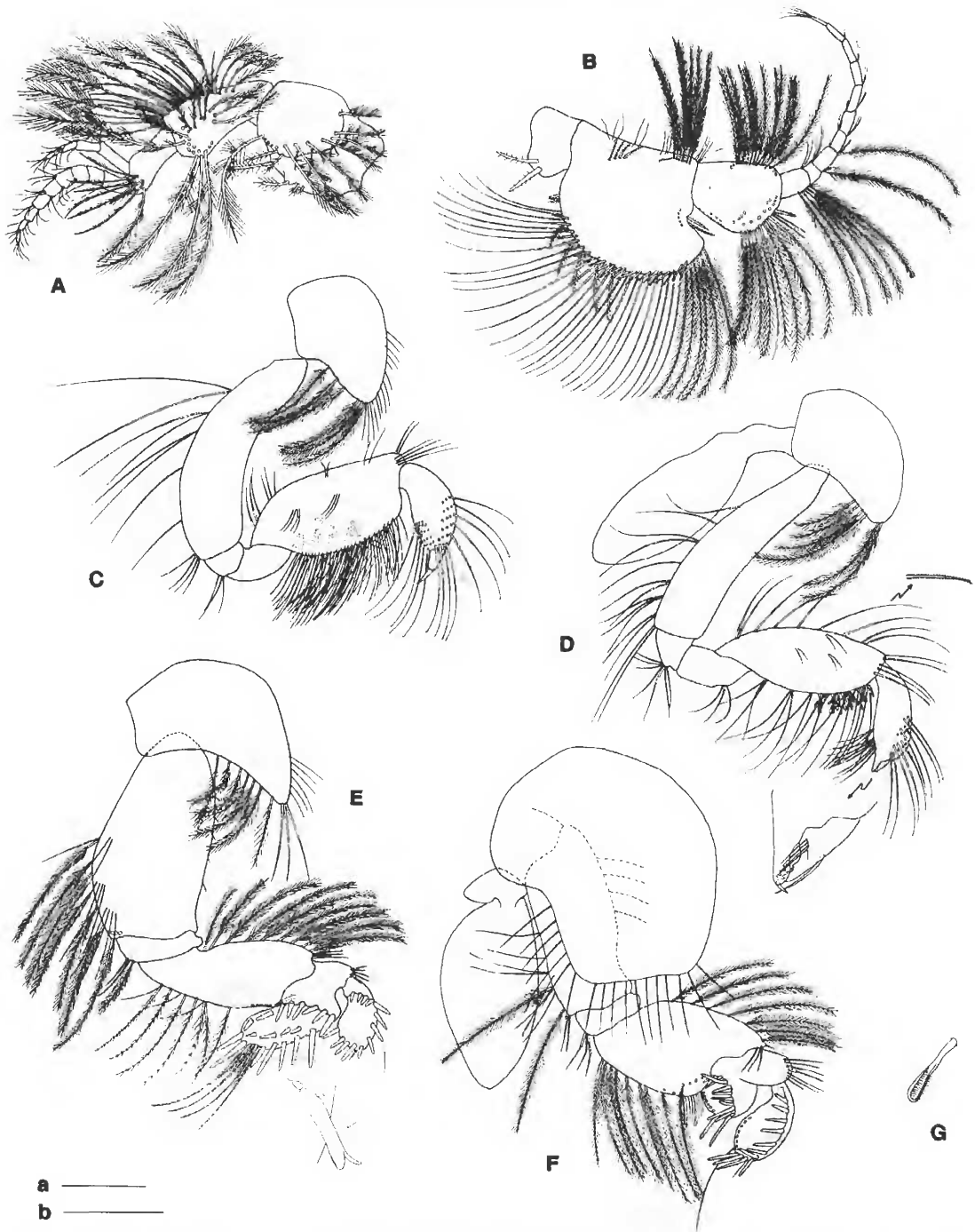


Figure 3. *Haustorius jayneae* n. sp., paratype male SAB-f (6.0 mm): (A) antenna 1; (B) antenna 2; (C) gnathopod 1; (D) gnathopod 2; (E) pereopod 3; (F) pereopod 4; (G) spatulate comb spine from gnathopod 2, article 5. Scales: a = 0.5 mm (E-F); b = 0.5 mm (A-D), 0.08 mm (G).

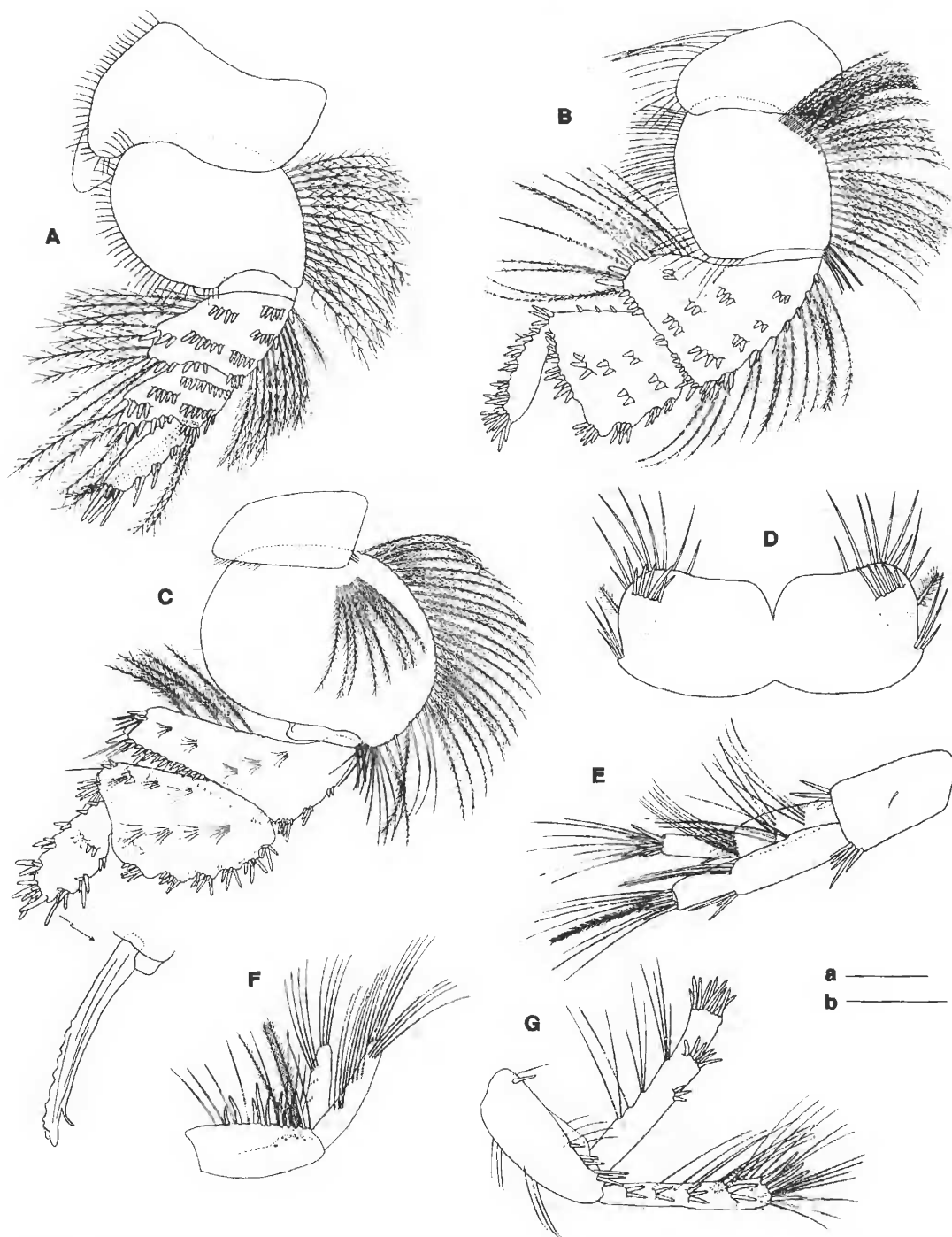


Figure 4. *Haustorius jayneae* n. sp., paratype male SAB-f (6.0 mm): (A) pereopod 5; (B) pereopod 6; (C) pereopod 7; (D) telson; (E) uropod 3; (F) uropod 2; (G) uropod 1. Scales: a = 0.5 mm (A-C); b = 0.2 mm (D), 0.4 mm (E-G).

Gnathopod 2 - Coxa deeper than wide, anterior margin convex, posterior margin nearly straight, with 6 plumose setae distally, anterodistal margin with 6 simple setae; article 2 slightly narrowed proximally with row of evenly spaced clusters of long simple setae on posterior margin; article 5, anterior margin with evenly spaced groups of minutely pectinate setae, outer lateral surface with scattered simple setae, anterodistal margin with cluster of 5 minutely pectinate setae, posterior margin with 3 - 5 groups of medially inserted, spatulate comb spines on distal half, row of simple setae along entire margin; article 6, anterior margin with 6 - 7 transverse rows of long, distally recurved, minutely pectinate setae, posterior margin with distal cluster of minutely pectinate setae, posterodistal margin strongly produced, dactyl toothed on flexor surface, closing on posterodistal process of article 6 to form chelate gnathopod.

Pereopod 3 - Coxa strongly convex anteriorly, posterior margin with 7 plumose setae, posterodistal angle with 3 long, simple setae, anterodistal margin with 6 shorter simple setae; article 2, distal half of posterior margin with several groups of simple setae along lateral surface, long plumose setae and several thin simple setae, posterodistal margin with 5 plumes and 1 short simple seta, anterior margin with 5 short, scattered setules; article 4, anterior margin lined with 9 plumose setae, anterodistal angle with a cluster of 3 simple setae, posterior margin with 6 groups of long plumose setae and short simple setae proximally, distal portion of posterior margin with a dense cluster of much longer plumose setae and 3 short simple setae; article 5 with a cluster of 5 - 6 simple setae on anterodistal margin, posterior lobe ovate, lined with 15 stout spines, some with accessory setules, lateral surface of lobe with 4 stout spines, posterior margin with 4 - 5 long plumose setae; article 6 subrectangular with 13 stout spines and 1 small seta on anterior and distal margins, posterior margin bare.

Pereopod 4 - Coxa broad, anterior margin strongly convex, posterior margin with strongly angular lobe, lined with simple setae; article 2 short with 4 short simple setae on anterior margin, posterior margin with 6 simple setae and 2 long plumed setae, posterodistal angle with 2 minutely pectinate setae; article 3 with 3 posterodistal minutely pectinate setae; article 4 lined with posterior marginal plumose setae and several scattered simple setae, posterodistal angle with 8 simple setae and a lateral row of 4 plumose setae, anterior margin lined with plumose setae, anterodistal angle with 2 simple and 3 minutely pectinate setae; article 5 with posteriorly directed circular lobe fringed with 11 stout spines and 7 long simple setae; article 6 with 11 stout anterior marginal spines, 7 long simple posterodistal marginal setae and 1 distal marginal setule.

Pereopod 5 - Coxa broad, posterior lobe slightly deeper and narrower than anterior, posterior margin lined with simple setae; article 2, posterior margin lined with simple setae, anterior margin lined with plumose setae

with several short setules proximally; article 4 with plumose setae on posterior margin, anterior margin with 3 stout marginal spines interspersed in a row of plumose setae, anterodistal margin with a cluster of 4 spines, distal margin with a row of 6 spines, lateral surface with 6 clusters of 3 - 6 stout spines, medial surface with clusters of plumose setae; article 5, distomedial margin with cluster of long plumose setae, posterior half of distal margin with a row of 6 stout spines, posterodistal margin lined with plumose setae, anterior margin with 1 cluster of 2 spines, anterodistal angle with cluster of 5 spines, lateral surface with 4 clusters of 4 - 10 stout spines; article 6 naked posteriorly, anterior margin with 3 clusters of 2 - 4 stout spines, terminally with 3 long and 2 short spines and 1 short plumose setule.

Pereopod 6 - Coxa rounded posteriorly, posterior margin lined with simple setae; article 2 subquadrate, posterior margin lined with simple setae proximally and distally, bare gap in center (present on most specimens), anterior margin with row of plumose setae and with row curving across lateral surface proximally, anterodistal margin with 3 long, pectinate setae; article 4 subtriangular, longer than broad, anterior margin lined with dense plumose setae occurring in medially placed diagonal rows, marginal spines stout, short, occurring in groups of 1 to 4, medial anterodistal angle with 1 long spine and numerous plumed setae, lateral anterodistal angle with 1 long spine, distolateral margin with 8 spines in row extending about one-quarter length of margin, center distal margin with a group of 2 spines, posterior distolateral margin with row of 4 spines, posterior margin with 4 stout spines and a row of plumose setae, proximal section of margin narrowing abruptly, lateral surface with clusters of 2 - 4 spines; article 5 subquadrate, slightly wider than long with defining lobe at anterodistal angle, anterior margin with 3 groups of 3 - 6 spines, anterodistal lobe with 5 spines, distal margin with central row of 12 spines, posterodistal angle with cluster of 4 spines, posterior margin with 3 spines, lateral surface with 5 groups of 1 - 3 spines, article 6 naked anteriorly, posterior margin with 5 groups of 2 - 5 spines, terminal spines 10.

Pereopod 7 - Coxa small, posterior lobe subacute, with simple setae on distal margin; article 2 ovate, with a cluster of proximal plumose facial setae, anterior margin lined with plumed setae, distal half of margin with 4 distally tapered pectinate setae, anterodistal angle with 9 pectinate setae, posterior margin with scattered short setules, or bare; article 4 much broader than long, proximal and distal margins nearly parallel posteriorly, widening anteriorly, anterior margin twice length of posterior with 2 groups of 2 - 4 spines, anterodistal angle with 8 spines, proximal margin lined with plumose setae, posterior margin with cluster of 1 long and 2 short stout spines, 1 long plumose setae (broken off), 5 pectinate setae, posterodistal angle with 1 stout spine, distomedial margin with row of 16 spines, distolateral margin with row of 10 spines extending over half the length of distal

margin, lateral and medial surfaces with scattered clusters of long setae; article 6, posterior margin with distal cluster of 2 stout spines and 1 pectinate seta, posterodistal angle with 2 short lateral spines, row of 4 longer medial spines, cluster of simple setae on medial margin, posterior facial spines 2, anterior marginal spines in 6 groups of 5 - 7 spines each, medial surface with oblique row of 4 spines near anterodistal margin, lateral and medial surfaces with numerous clusters of simple setae; article 6 anterior marginal spines in 3 groups of 2 - 4 spines each, posterior marginal spines in 4 groups of 1 - 4 spines each, medial surface with 1 group of 3 spines, lateral surface with 1 group of 2 spines, terminal spines 7.

Pleopods - Pleopod 1, outer ramus with 15 segments, inner with 12; pleopod 2, outer ramus with 17 segments, inner with 12; pleopod 3 outer ramus with 16 segments, inner with 13.

Pleosome - With characteristics of the genus.

Uropod 1 - Ventromedial margin of peduncle with 2 clusters of simple setae, dorsal margin with 1 simple seta and 1 stout spine proximally, 3 stout spines distally, interramal area with 3 spines; outer ramus shorter than inner with lateral spine groups 2-2-3-4, medial surface with 5 groups of long simple setae, increasing in number distally, terminal spines 6; inner ramus, ventrolateral marginal spines on distal half in 2 groups of 3 - 7 spines each, dorsal margin with 4 groups of simple setae, terminal spines 9.

Uropod 2 - Dorsolateral margin of peduncle with a row of slender spines of varying lengths interspersed with long simple setae, dorsomedial margin of peduncle with distal cluster of long plumose setae; outer ramus slightly longer than inner, lateral surface with 3 clusters of long simple setae, terminal group of long setae; inner ramus similar.

Uropod 3 - Peduncle with 9 (5 medial, 4 lateral) spines; rami subequal, inner ramus with distal group of 3 spines on medial margin, 2 groups of long simple setae on lateral margin, terminally with 5 spines, numerous long, simple setae, 1 plumed seta; outer ramus 2-segmented, proximal segment with 2 dorsomarginal and 1 dorsodistal groups of simple setae, 6 distoventral spines, distal segment slightly shorter than proximal segment, thinner, with 7 terminal spines, numerous long simple setae.

Telson - Cleft one-third distance to base, lobes subrectangular with small proximolateral lobes bearing 3 spines, distal margin with 9 spines, submarginal cluster with 6 spines, dorsal surface with 1 long and 1 short penicillate seta on each lobe.

Holotype Female SAB-e, 6.0 mm, St. Andrew Bay, Florida

Similar to male except for the following:

Oostegites - Slender, increasing in length posteriorly on pereopods 2 - 4, very small on pereopod 5, marginal setae elongate, simple.

Distribution

Haustorius jayneae occurs along sand beaches from Cape San Blas, Florida (Gulf County) to Mississippi Sound. It inhabits tidal pools and the swash zone seaward to a depth of two meters; however, most individuals occur in depths less than one foot.

Ecology

At Panama City Beach, Florida, monthly densities of *Haustorius jayneae* and its distribution across the nearshore zone were studied for a period of years by Saloman (1976) and Saloman and Naughton (1977;1978;1984). The swash zone population was shown to be the greatest in March and April of 1974-1975 with similar peaks during May and June of 1976. In a series of stations, beginning in the swash zone, extending through a series of sand bars, and terminating at a depth of 9.1 meters, *H. jayneae* occurred primarily in the swash zone and on the first sand bar (5.5% and 8.8% of all organisms collected, respectively). No specimens were recovered from the 9.1 meter station. This conforms to the pattern observed by Sameoto (1969) for *H. canadensis* at Sippewissett, Massachusetts, in that greatest densities are found in areas of complete saturation at low tide, such as sand bars. Juveniles were present during all months and ovigerous females were present in all samples examined except those from January and May.

The study area displayed an annual temperature variation of 19.0 to 32.1 °C and had an average salinity of 31.8 ppt. The sediments consisted of 99-100% quartz sand (Saloman, 1976). During a later nine month study in the same area, *H. jayneae* comprised 16.5% of the total population of organisms recovered from the swash zone, 55% of the Crustacea and 99% of the Amphipoda. At the first sand bar, *H. jayneae* comprised 34.1% of all organisms, 47% of Crustacea, and 93% of Amphipoda. May and June were peak population periods (Saloman and Naughton, 1984).

Saloman et al. (1982) investigated the macroinfauna of vegetated and unvegetated sediments within St. Andrew Bay and reported an undescribed *Haustorius* from four localities. While those specimens were not available for study, one of the stations conformed to the type locality of *H. jayneae*. The locality, at West Pass of St. Andrew Bay, was unvegetated 100% sand.

Etymology

This species is named in honor of Jayne E. Foster, whose patience and support for this project are greatly appreciated.

Variation

Within the samples examined from four locations on the northern Gulf coast, *H. jayneae* showed minor intra-

specific variation (Table 1). Minor variations were observed in the number of accessory flagellum segments, spination of the pereopods, and the spination of the dorsolateral margin of the peduncle of uropod 1. There was also a trend toward an increase in the number of spines in all areas with increasing animal size. This variability is to be expected in highly spinous fossorial forms such as the Haustoriidae (Thomas and Barnard, 1984).

Remarks

Haustorius jayneae is most closely related to *H. canadensis* Bousfield, 1962 from the American Atlantic coast. Major morphological differences between it and other known species are shown in the key and in Tables 2 and 3.

KEY TO THE KNOWN SPECIES OF *HAUSTORIUS* (Modified from Bousfield, 1973)

TABLE 1

Intraspecific Variation in Selected Characters of *Haustorius jayneae*

Character	Size Groupings of Paratypes				Overall Range
	4.0–5.0mm	5.1–6.0mm Range (Mean)	6.1–8.0mm	8.41–10.0mm	
Antenna 1, # accessory flagellum segments	4 (4.0)	4 (4.0)	4–5 (4.1)	4–5* (4.5)	4–5
Mandible palp 3, # comb spines	11–17 (13.0)	12–20 (16.1)	16–20 (16.6)	22–23 (22.5)	12–23
Pereopod 5, article 4, # posterodistal spines	5 (5.0)	5–8 (6.4)	5–9 (6.8)	6–7 (6.5)	5–9
Pereopod 5, article 6, # anterior marginal spine groups	3 (3.0)	3 (3.0)	3–4** (3.3)	3 (3.0)	3–4
Pereopod 6, article 4, # posterodistal spines	5–6 (5.3)	4–8 (6.3)	6–9 (7.6)	6–10 (8.0)	4–10
Pereopod 7, article 4, # long medial posterior marginal spines	1 (1.0)	1 (1.0)	1 (1.0)	1 (1.0)	1
Pereopod 7, article 4, # posterodistal spines	6–8 (6.8)	6–11 (8.6)	9–18 (12.0)	9–10 (9.5)	6–18
Pereopod 7, article 5, # anterior marginal spine groups	6 (6.0)	6–7 (6.3)	6–7 (6.4)	7 (7.0)	6–7

* Two specimens, MISS-b and MISS-c had 5 segments

** One specimen, PK-f had 4 groups

TABLE 2

Comparison of *Haustorius jayneae* and *Haustorius canadensis*

Character	<i>H. canadensis</i>	<i>H. jayneae</i>
Rostrum	Acute, less broad basally	Subacute, triangular, wide at base
Pereopod 5, article 6	4-5 anterior marginal spine groups	3, occasionally 4 spine groups
Pereopod 6, article 4	Long posterior margin before proximal narrowing, 6 posterior spines	Shorter posterior margin, more distal point of proximal narrowing, segment triangular, 3 posterior spines
Pereopod 6, article 5	Anterior margin rounded gently to distal margin without clear anterodistal angle, 6 spine groups along curve	Article subquadrate with a distinct anterodistal defining lobe, lobe with a cluster of 3 spines, distal and anterior spines present
Pereopod 7, coxal plate	Setae along entire posterior margin	Setae on posterodistal margin only
Pereopod 7, article 4	Spines on distolateral margin limited to posterior one-fourth of margin, closely spaced	Spines on distolateral margin more widely spaced and extending at least one-half length of margin
Uropod 1, peduncle	3-4 proximal spines, and 1-2 proximal setae	1-2 proximal spines and occasionally 1 proximal seta

1. Uropod 1, dorsolateral margin of peduncle lined throughout with stout spines; pereopod 7, article 4, proximal margin rounding, continuous with posterior margin; EUROPEAN SPECIES.....2

Uropod 1, dorsolateral margin of peduncle with proximal and distal groups of spines; pereopod 7, article 4, proximal margin sharply set off from posterior margin; AMERICAN SPECIES..... 3

2. Accessory flagellum 4+ segmented; pereopod 7, posterior margin of article 4 with 3-4 stiff spine groups *H. arenarius* (Slabber)

Accessory flagellum 3-segmented; pereopod 7, proximal and posterior margin of article 4 lined continuously with long stiff setae *H. algeriensis* Mulot

3. Rostrum very long, extending to the end of antenna 1, peduncle segment 1 *Haustorius* "long rostrate form"

Rostrum short, not exceeding midpoint of antenna 1, peduncle segment 1 4

4. Pereopod 6, article 5, anterodistal angle broadly rounding; pereopod 7, coxal plate with setae along entire posterior margin, article 4, distolateral marginal spines

limited to posterior quarter of distal margin *H. canadensis* Bousfield

Pereopod 6, article 5, anterodistal angle with defining lobe bearing a spine cluster; pereopod 7, coxal plate with setae on posterodistal margin only, article 4, distolateral marginal spines extending to mid-margin *H. jayneae* n. sp.

ACKNOWLEDGEMENTS

The authors wish to thank Dr. Richard W. Heard of the Gulf Coast Research Laboratory for technical assistance and specimens from Perdido Key, Florida and Horn and Ship Islands, Mississippi (collected under contract to the National Park Service). Dr. Edwin J. Keppner of Panama City Beach, Florida, also provided technical support. We thank Dr. Roger Lincoln of the British Museum, Dr. J. L. Barnard of the Smithsonian Institution, and Dr. Denise Bellan-Santini of the Institut océanographique of Monaco for providing additional specimens and/or information. We also thank the Gulf County, Florida, County Commission for their assistance at Cape San Blas. We benefited from and appreciate the contributions of two anonymous reviewers. Many of their suggestions were incorporated into this paper. This research was supported in part by the National Park Service (Contract #CA-5320-9-8001).

TABLE 3

Comparison of Selected Characters of the Known Species of *Haustorius*

Character	<i>H. jayneae</i>	<i>H. canadensis</i> Bousfield, 1962	<i>H. arenarius</i> ² (Slabber, 1769)	<i>H. algeriensis</i> ¹ Mulot, 1967
Antenna 1, # accessory flagellum segments	4-5	4	3-5	3-4
Rostrum length relative to dorsally exposed peduncle of antenna 1	20%	20%	Less than 20%	Undetermined
Shape of rostrum	Subacute	Acute	Subacute	Undetermined
Maxilla 2, outer plate, distal shape	Subacute	Subacute	Acute	Sharply rounded
Pereopod 5, article 4, # anterior spines	2-4	4	4	1
Pereopod 5, article 6, # anterior marginal spine groups	3-4	4-5	3-4	3
Pereopod 6, article 4, width as % length	75%	67%	70%	66-70%
Pereopod 6, article 5, shape of anterodistal margin	Anterodistal lobe with spine group	Broadly rounded without lobe	Angular, but without lobe	Rounded
Pereopod 7, article 4, distolateral spine locations	Posterior to center of distal margin	Posterior distal margin	Posterior and center of distal margin	Posterior distal margin
Uropod 1, peduncle spine locations	Proximal and distal only	Proximal and distal only	Entire margin	Entire margin

¹Derived from Mulot (1967) and Bellan-Santini (1989)

²Based upon material from U.S. National Museum and British Museum of Natural History and Lincoln (1979)

REFERENCES CITED

- Barnard, J.L. 1957. A new genus of haustoriid amphipod from the northeastern Pacific Ocean and the southern distribution of *Urothoe varvarni* Gurjanova. *Bull. S. Calif. Acad. Sci.* 56: 81-84.
- Bellan-Santini, D. 1989. Family Haustoriidae. In: The Amphipoda of the Mediterranean. Part 2. Gammaridea (Haustoriidae to Lysianassidae) (S. Ruffo, ed.). *Mem. Inst. Oceanographique, Monaco*, No. 13: 365-384.
- Bousfield, E.L. 1962. New haustoriid amphipods from the Canadian Atlantic region. *Bull. Nat. Mus. Canada* 183: 63-75.
- Bousfield, E.L. 1965. Haustoriidae of New England (Crustacea: Amphipoda). *Proc. U.S. Nat. Mus.* 117(3512): 159-240.
- Bousfield, E.L. 1970. Adaptive radiation in sand-burrowing amphipod crustaceans. *Chesapeake Sci.* 11(3): 143-154.
- Bousfield, E.L. 1973. *The shallow water gammaridean amphipods of New England*. Comstock Pub. Associates, 312 pp.
- Bulycheva, A I. 1952. Novye vidy bokoplavov (Amphipoda: Gammaridea) iz Japonskogo Morja. *Akad. Nauk SSSR, Trudy Zool. Inst.* 12: 195-200.
- Crocker, R.A. 1967. Niche diversity in five sympatric species of intertidal amphipods (Crustacea: Haustoriidae). *Ecol. Mono.* 37(3): 173-200.
- Foster, J.M. 1989. *Acanthohaustorius uncinus*, a new species of sand-burrowing amphipod from the northern Gulf of Mexico, with notes on its ecology (Haustoriidae: Haustoriinae). *Gulf Res. Rept.* 8(2): 189-197.
- Fox, R.S. and K.H. Bynum. 1975. The amphipod crustaceans of North Carolina estuarine waters. *Chesapeake Sci.* 16(4):223-237.
- Gurjanova, E. 1951. Amphipoda-Gammaridea of the seas of the USSR and adjoining waters - Keys to the fauna of the USSR. *Zool. Inst. Acad. Sci. USSR*, No. 41, 1029 pp. (in Russian)
- Heard, R.W. and K. Stuck. 1988. Study of the composition and dynamics of the brackish and marine macroinvertebrates

- of Horn and Ship Islands, Mississippi, and Perdido Key, Florida. Final Report, Contract No. CX1600-3-0005, Department of Interior, National Park Service.
- Hopkins, T.S., Valentine, J.F. and L.B. Lutz. 1989. An illustrated guide with key to selected benthic invertebrate fauna of the northern Gulf of Mexico. Alabama-Mississippi Sea Grant Consortium, MASGP-87-010, 163 pp.
- Lincoln, R.J. 1979. *British marine Amphipoda: Gammaridea*. British Museum (Natural History), 658 pp.
- Mulot, M. 1967. Description d'*Haustorius algeriensis* n. sp. (Amphipoda: Haustoriidae). *Bull. Soc. Zool. France* 92(4): 815-826.
- Pearse, A.S. 1908. Descriptions of four new species of amphipodous Crustacea from the Gulf of Mexico. *Proc. U.S. Nat. Mus.* 34(1936): 369-379.
- Robertson, P.B. and C.R. Shelton. 1978. Two new species of haustoriid amphipods (Crustacea: Amphipoda) from the northwestern Gulf of Mexico. *Contrib. Mar. Sci.* 21: 47-62.
- Robertson, P.B. and C.R. Shelton. 1980. *Lepidactylus triarticulatus* n. sp., a new species of haustoriid amphipod from the northern Gulf of Mexico. *Gulf Res. Rept.* 6(4): 415-420.
- Saloman, C.H. 1976. The benthic fauna and sediments of the nearshore zone off Panama City Beach, Florida. U.S. Army Corps of Engineers Res. Center, Interservice Support Agreement No. 76-10, 256 pp.
- Saloman, C.H. and S.P. Naughton. 1977. Effect of Hurricane Eloise on the benthic fauna of Panama City Beach, Florida, U.S.A. *Mar. Biol.* 42 (4): 357-363.
- Saloman, C.H. and S.P. Naughton. 1978. Benthic macroinvertebrates inhabiting the swash zone of Panama City Beach, Florida. *Northeast Gulf Sci.* 2: 65-72.
- Saloman, C.H. and S.P. Naughton. 1984. Beach restoration with offshore dredged sand: effects on nearshore macrofauna. NOAA Administration Tech. Memo., NMFS-SEFC-133, 20 pp.
- Saloman, C.H., Naughton, S.P., and J.L. Taylor. 1982. Benthic faunal assemblages of shallow water sand and seagrass habitats, St. Andrew Bay, Florida. U.S. Fish Wildl. Ser., Div. Ecolog. Ser., Panama City, Florida, 565 pp.
- Sameoto, D.D. 1969. Comparative ecology, life histories, and behavior of intertidal sand-burrowing amphipods (Crustacea: Haustoriidae) at Cape Cod. *J. Fish. Res. Bd. Canada* 26(2): 361-388.
- Shelton, C.R. and P.B. Robertson. 1981. Community structure of intertidal macrofauna of two surf-exposed Texas sandy beaches. *Bull. Mar. Sci.* 31(4): 833-842.
- Taylor, J.L. 1987. Michigan Avenue sewer outfall environmental monitoring study. Final Report to Panama City, Florida Engineering Department, Taylor Biological Company, Lynn Haven, Florida.
- Thomas, J.D. 1976. A survey of gammarid amphipoda of the Barataria Bay, Louisiana region. *Contrib. Mar. Sci.* 20: 87-100.
- Thomas, J.D. and J.L. Barnard. 1984. *Acanthohaustorius pansus*, a new species of sand-burrowing amphipod from Looe Key Reef, Florida Keys, with redescription of *A. bousfieldi* Frame, 1980 (Amphipoda: Haustoriidae). *Proc. Biol. Soc. Wash.* 97(4): 909-926.